

**THAT WHICH IS CLAIMED IS:**

1. A self-tuned millimeter wave transceiver module comprising:
  - a microwave monolithic integrated circuit (MMIC) having at least one amplifier; and
  - 5 a controller operatively connected to said MMIC for sensing amplifier operating conditions and tuning the at least one amplifier to an optimum operating condition.
2. A self-tuned millimeter wave transceiver module according to Claim 1, wherein said controller comprises a surface mounted microcontroller chip operatively connected to said MMIC.
3. A self-tuned millimeter wave transceiver module according to Claim 1, wherein said controller comprises a memory having stored values of optimum operating conditions for the at least one amplifier  
5 such that said controller tunes the at least one amplifier based on the stored values of optimum operating conditions.
4. A self-tuned millimeter wave transceiver module according to Claim 3, wherein said memory comprises an EEPROM.
5. A self-tuned millimeter wave transceiver module according to Claim 3, wherein said stored values of optimum operating conditions comprise stored values of preset MMIC characteristics, including optimum drain  
5 current and expected amplifier output at various stages in a radio frequency circuit.

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6. A self-tuned millimeter wave transceiver module according to Claim 1, wherein said controller further comprises a sensor for sensing changes in operating amplifier conditions by the at least one  
5 amplifier, wherein said controller adjusts the at least one amplifier based on sensed changes in amplifier operating conditions.

7. A self-tuned millimeter wave transceiver module according to Claim 6, and further comprising a digital potentiometer operatively connected to said at least one amplifier for stepping gate voltage within  
5 the at least one amplifier based on sensed changes in amplifier operating conditions.

8. A self-tuned millimeter wave transceiver module according to Claim 6, and further comprising a multi-channel analog-to-digital converter operatively connected to said sensor for digitizing sensor output  
5 to be compared with stored values of optimum operating conditions.

9. A self-tuned millimeter wave transceiver module according to Claim 1, and further comprising a temperature sensor for measuring the temperature of said MMIC, wherein said controller is responsive to  
5 sensed temperature for determining whether any change in amplifier operating conditions is a result of a changed temperature or a malfunction.

10. A self-tuned millimeter wave transceiver module according to Claim 1, and further comprising a power sensor diode operatively connected to said at least one amplifier, wherein said controller is

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- 5 responsive to said power sensor diode for tuning said  
at least one amplifier.

11. A self-tuned millimeter wave transceiver  
module according to Claim 1, wherein said controller is  
operative for correcting one of at least (a) gain  
variation over temperature; (b) linearization of the  
5 power monitor circuit as a function of temperature and  
frequency; (c) gain equalization as a function of  
frequency; and (d) power attenuation linearization as a  
function of frequency and temperature.

12. A self-tuned millimeter wave transceiver  
module comprising:

a microwave monolithic integrated circuit  
(MMIC) having a plurality of amplifiers, each having a  
5 respective source, drain and gate;

a controller operatively connected to said  
MMIC and each of said amplifiers, said controller  
including a memory having stored values of optimum  
operating conditions for an amplifier, wherein said  
10 controller is operative for sensing operating  
conditions and tuning each amplifier to an optimized  
operating condition based on the stored values.

13. A self-tuned millimeter wave transceiver  
module according to Claim 12, wherein said controller  
further comprises at least one sensor for sensing  
amplifier operating conditions for said amplifiers  
5 within said MMIC, a multi-channel, analog-to-digital  
converter operatively connected to said sensor that  
digitizes sensor output, and a microprocessor  
operatively connected to said analog-to-digital  
converter for comparing any digitized output with

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10 stored values within said memory and controlling the  
tuning of said amplifiers.

14. A self-tuned millimeter wave transceiver  
module according to Claim 12, wherein said controller  
comprises a surface mounted microcontroller chip  
operatively connected to said MMIC.

15. A self-tuned millimeter wave transceiver  
module according to Claim 12, wherein said memory  
comprises an EEPROM.

16. A self-tuned millimeter wave transceiver  
module according to Claim 12, wherein said stored  
values of optimum operating conditions comprise stored  
values of preset MMIC characteristics, including  
5 optimum drain current and expected amplifier output at  
various stages in a radio frequency circuit.

17. A self-tuned millimeter wave transceiver  
module according to Claim 12, wherein said controller  
further comprises at least one sensor for measuring  
changes in current drawn by the amplifiers, wherein  
5 said controller adjusts the amplifiers based on changes  
in current and the stored values for optimum operating  
conditions.

18. A self-tuned millimeter wave transceiver  
module according to Claim 12, and further comprising a  
digital potentiometer operatively connected to the  
amplifiers for stepping gate voltage within the  
5 amplifiers based sensed operating conditions each  
amplifier.

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19. A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller further comprises a multi-channel, analog-to-digital converter that digitizes sensed operating conditions to  
5 be compared with stored values of optimum operating conditions.

20. A self-tuned millimeter wave transceiver module according to Claim 12, and further comprising a temperature sensor for measuring the temperature of said MMIC, wherein said controller is responsive to  
5 sensed temperature for determining whether any change in amplifier current is a result of changed temperature conditions or malfunction.

21. A self-tuned millimeter wave transceiver module according to Claim 12, and further comprising a power sensor diode operatively connected to said at least one amplifier, wherein said controller is  
5 responsive to said power sensor diode for tuning said at least one amplifier.

22. A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller is operative for correcting one of at least (a) gain variation over temperature; (b) linearization of the  
5 power monitor circuit as a function of temperature and frequency; (c) gain equalization as a function of frequency; and (d) power attenuation linearization as a function of frequency and temperature.

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